

WHAT IS CLAIMED IS:

1. A liquid crystal display device comprising:
a thin film transistor formed over a substrate, the thin film transistor comprising:
a gate electrode formed over the substrate;
a gate insulating film formed over the gate electrode;
a substantially intrinsic semiconductor layer formed over the gate insulating film;
an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;
at least one of a source and a drain electrodes formed over the n-type semiconductor layer;
an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer; and
a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes.

2. A liquid crystal display device comprising:
a thin film transistor formed over a substrate, the thin film transistor comprising:
a gate electrode formed over the substrate;
a gate insulating film formed over the gate electrode;
a substantially intrinsic semiconductor layer formed over the gate insulating film;
an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type semiconductor layer, wherein an edge of the at least one of the source and the drain electrodes is aligned with an edge of the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes.

3. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:

a gate electrode formed over the substrate;

a gate insulating film formed over the gate electrode;

a substantially intrinsic semiconductor layer formed over the gate insulating film;

an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes, and wherein a contact portion between the pixel electrode and the at least one of the source and the drain

electrodes is not formed over the n-type semiconductor layer.

4. A liquid crystal display device comprising:
a thin film transistor formed over a substrate, the thin film transistor comprising:
a gate electrode formed over the substrate;
a gate insulating film formed over the gate electrode;
a substantially intrinsic semiconductor layer formed over the gate insulating film;
an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;
at least one of a source and a drain electrodes formed over the n-type semiconductor layer;
an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, and wherein the insulating film is in contact with an edge of the n-type semiconductor layer; and
a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes.

5. A liquid crystal display device comprising:
a thin film transistor formed over a substrate, the thin film transistor comprising:
a gate electrode formed over the substrate;
a gate insulating film formed over the gate electrode;
a substantially intrinsic semiconductor layer formed over the gate insulating film;
an n-type semiconductor layer formed over the substantially intrinsic

semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, and wherein the insulating film is in contact with the gate insulating film; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes.

6. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:

a gate electrode formed over the substrate;

a gate insulating film formed over the gate electrode;

a substantially intrinsic semiconductor layer formed over the gate insulating film;

an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer;

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes;

a first orientation film formed on the insulating film and on the pixel electrode;

- a counter substrate opposing the substrate;
- a counter electrode formed over the counter substrate;
- a second orientation film formed over the counter electrode; and
- a liquid crystal interposed between the substrate and the counter substrate.

7. A liquid crystal display device comprising:

- a thin film transistor formed over a substrate, the thin film transistor comprising:
 - a gate electrode formed over the substrate;
 - a gate insulating film formed over the gate electrode;
 - a substantially intrinsic semiconductor layer formed over the gate insulating film;
 - an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;
- at least one of a source and a drain electrodes formed over the n-type semiconductor layer, wherein an edge of the at least one of the source and the drain electrodes is aligned with an edge of the n-type semiconductor layer;
- an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer; and
- a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes, and wherein a contact portion between the pixel electrode and the at least one of the source and the drain electrodes is not formed over the n-type semiconductor layer.

8. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:
a gate electrode formed over the substrate;
a gate insulating film formed over the gate electrode;
a substantially intrinsic semiconductor layer formed over the gate insulating film;
an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type semiconductor layer, wherein an edge of the at least one of the source and the drain electrodes is aligned with an edge of the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, and wherein the insulating film is in contact with an edge of the n-type semiconductor layer; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes.

9. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:
a gate electrode formed over the substrate;
a gate insulating film formed over the gate electrode;
a substantially intrinsic semiconductor layer formed over the gate insulating film;
an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type

semiconductor layer, wherein an edge of the at least one of the source and the drain electrodes is aligned with an edge of the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, and wherein the insulating film is in contact with the gate insulating film; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes.

10. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:

a gate electrode formed over the substrate;

a gate insulating film formed over the gate electrode;

a substantially intrinsic semiconductor layer formed over the gate insulating film;

an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type semiconductor layer, wherein an edge of the at least one of the source and the drain electrodes is aligned with an edge of the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes;

a first orientation film formed on the insulating film and on the pixel electrode;

- a counter substrate opposing the substrate;
- a counter electrode formed over the second substrate;
- a second orientation film formed over the counter electrode; and
- a liquid crystal interposed between the substrate and the counter substrate.

11. A liquid crystal display device comprising:

- a thin film transistor formed over a substrate, the thin film transistor comprising:

- a gate electrode formed over the substrate;

- a gate insulating film formed over the gate electrode;

- a substantially intrinsic semiconductor layer formed over the gate insulating film;

- an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

- at least one of a source and a drain electrodes formed over the n-type semiconductor layer;

- an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, and wherein the insulating film is in contact with an edge of the n-type semiconductor layer; and

- a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes, and wherein a contact portion between the pixel electrode and the at least one of the source and the drain electrodes is not formed over the n-type semiconductor layer.

12. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:
a gate electrode formed over the substrate;
a gate insulating film formed over the gate electrode;
a substantially intrinsic semiconductor layer formed over the gate insulating film;
an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;
at least one of a source and a drain electrodes formed over the n-type semiconductor layer;
an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, and wherein the insulating film is in contact with the gate insulating film; and
a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes, and wherein a contact portion between the pixel electrode and the at least one of the source and the drain electrodes is not formed over the n-type semiconductor layer.

13. A liquid crystal display device comprising:
a thin film transistor formed over a substrate, the thin film transistor comprising:
a gate electrode formed over the substrate;
a gate insulating film formed over the gate electrode;
a substantially intrinsic semiconductor layer formed over the gate insulating film;
an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;
at least one of a source and a drain electrodes formed over the n-type

semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes, and wherein a contact portion between the pixel electrode and the at least one of the source and the drain electrodes is not formed over the n-type semiconductor layer;

a first orientation film formed on the insulating film and on the pixel electrode;

a counter substrate opposing the substrate;

a counter electrode formed over the counter substrate;

a second orientation film formed over the counter electrode; and

a liquid crystal interposed between the substrate and the counter substrate.

14. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:

a gate electrode formed over the substrate;

a gate insulating film formed over the gate electrode;

a substantially intrinsic semiconductor layer formed over the gate insulating film;

an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor,

wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, wherein the insulating film is in contact with an edge of the n-type semiconductor layer, and wherein the insulating film is in contact with the gate insulating film; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes.

15. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:

a gate electrode formed over the substrate;

a gate insulating film formed over the gate electrode;

a substantially intrinsic semiconductor layer formed over the gate insulating film;

an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

at least one a source and a drain electrodes formed over the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, and wherein the insulating film is in contact with an edge of the n-type semiconductor layer; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes;

a first orientation film formed on the insulating film and on the pixel electrode;

a counter substrate opposing the substrate;

a counter electrode formed over the counter substrate;

a second orientation film formed over the counter electrode; and
a liquid crystal interposed between the substrate and the counter substrate.

16. A liquid crystal display device comprising:
a thin film transistor formed over a substrate, the thin film transistor comprising:
a gate electrode formed over the substrate;
a gate insulating film formed over the gate electrode;
a substantially intrinsic semiconductor layer formed over the gate insulating film;
an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;
at least one of a source and a drain electrodes formed over the n-type semiconductor layer;
an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, and wherein the insulating film is in contact with the gate insulating film;
a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes;
a first orientation film formed on the insulating film and on the pixel electrode;
a counter substrate opposing the substrate;
a counter electrode formed over the counter substrate;
a second orientation film formed over the counter electrode; and
a liquid crystal interposed between the substrate and the counter substrate.

17. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:
a gate electrode formed over the substrate;
a gate insulating film formed over the gate electrode;
a substantially intrinsic semiconductor layer formed over the gate insulating film;
an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type semiconductor layer, wherein an edge of the at least one of the source and the drain electrodes is aligned with an edge of the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, and wherein the insulating film is in contact with an edge of the n-type semiconductor layer; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes, and wherein a contact portion between the pixel electrode and the at least one of the source and the drain electrodes is not formed over the n-type semiconductor layer.

18. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:
a gate electrode formed over the substrate;
a gate insulating film formed over the gate electrode;
a substantially intrinsic semiconductor layer formed over the gate insulating film;
an n-type semiconductor layer formed over the substantially intrinsic

semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type semiconductor layer, wherein an edge of the at least one of the source and the drain electrodes is aligned with an edge of the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, and wherein the insulating film is in contact with the gate insulating film; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes, and wherein a contact portion between the pixel electrode and the at least one of the source and the drain electrodes is not formed over the n-type semiconductor layer.

19. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:

a gate electrode formed over the substrate;

a gate insulating film formed over the gate electrode;

a substantially intrinsic semiconductor layer formed over the gate insulating film;

an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type semiconductor layer, wherein an edge of the at least one of the source and the drain electrodes is aligned with an edge of the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor

layer; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes, and wherein a contact portion between the pixel electrode and the at least one of the source and the drain electrodes is not formed over the n-type semiconductor layer;

a first orientation film formed on the insulating film and on the pixel electrode;

a counter substrate opposing the substrate;

a counter electrode formed over the counter substrate;

a second orientation film formed over the counter electrode; and

a liquid crystal interposed between the substrate and the counter substrate.

20. A liquid crystal display device comprising:

a thin film transistor formed over a substrate, the thin film transistor comprising:

a gate electrode formed over the substrate;

a gate insulating film formed over the gate electrode;

a substantially intrinsic semiconductor layer formed over the gate insulating film;

an n-type semiconductor layer formed over the substantially intrinsic semiconductor layer;

at least one of a source and a drain electrodes formed over the n-type semiconductor layer, wherein an edge of the at least one of the source and the drain electrodes is aligned with an edge of the n-type semiconductor layer;

an insulating film comprising a resinous material formed over the thin film transistor, wherein the insulating film is not in contact with the substantially intrinsic semiconductor layer, wherein the insulating film is in contact with an edge of the n-type semiconductor

layer, and wherein the insulating film is in contact with the gate insulating film; and

a pixel electrode formed over the insulating film, wherein the pixel electrode is in contact with the at least one of the source and the drain electrodes, and wherein a contact portion between the pixel electrode and the at least one of the source and the drain electrodes is not formed over the n-type semiconductor layer;

a first orientation film formed on the insulating film and on the pixel electrode;

a counter substrate opposing the substrate;

a counter electrode formed over the counter substrate;

a second orientation film formed over the counter electrode; and

a liquid crystal interposed between the substrate and the counter substrate.

21. A liquid crystal display device according to any one of claims 1-20, wherein the substrate comprises one selected from the group consisting of polyethylene terephthalate, polyethylene naphthalate, polyethylene sulfite, and polyimide.

22. A liquid crystal display device according to any one of claims 1-20, wherein the gate insulating film comprises silicon oxide or silicon nitride.

23. A liquid crystal display device according to any one of claims 1-20, wherein the substantially intrinsic semiconductor layer comprises amorphous silicon or microcrystalline silicon.

24. A liquid crystal display device according to any one of claims 1-20, wherein the at least one of the source and the drain electrodes comprises aluminum.

25. A liquid crystal display device according to any one of claims 1-20, wherein the insulating film comprising the resinous material comprises polyimide.

26. A liquid crystal display device according to any one of claims 1-20, wherein the pixel electrode comprises ITO.